#19
8/4/04
Dobbs

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

I hereby certify that this correspondence is being deposited with the United States Postal Service as FIRST CLASS MAIL in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, DC 20231 on:
July 23, 2004
Date of Mailing
Lindsey McG
Signature

APPEAL BRIEF OF Bradley Cain
FOR
System, Device & Method for Distributing Link State Information in a Communication Network

Serial No. 09/455,955
Filed: December 7, 1999

Appeal from a decision of the Primary Examiner dated September 24, 2003
Technology Center 2663
Examiner Duc T. Duong

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

I. Real Party in Interest

The real party in interest is Nortel Networks, Limited.

II. Related Appeals and Interferences

Appellants are not aware of any appeals or interferences that are related to the present case.

III. Status of the Claims

This is an appeal brief from a decision by the Primary Examiner dated September 24, 2003, finally rejecting claims 1-31, currently pending in the present application. No claims have been allowed. Claims 4, 5 and 6 have been cancelled. Claims 1-3, and 7-31 are the subject of this appeal. A notice of Appeal was filed on March 23, 2004.

IV. Status of Amendments

In the Final Office Action dated September 24, 2003, claims 1-31 were rejected under 35 U.S.C. §103. On January 26, 2004, Appellants filed a response pursuant to 37 C.F.R. §1.116(a) which did not amend any of the claims. On February 25, 2004 the Examiner forwarded an Advisory Action to Appellant.

V. Summary of the Invention

A. Background

In today's information age, communication networks are often used for interconnecting computers and computer peripherals. A communication network typically includes a number of nodes that interoperate to route protocol messages. The

various nodes in the communication network utilize various routing protocols in order to determine the routes that are used to route the protocol messages.

One type of routing protocol, known as a "link state" routing protocol, determines routes based upon the status of communication links between the various nodes. A link state routing protocol, such as the Open Shortest Path First (OSPF) routing protocol, requires each node to have complete topology information. Each node maintains a topology database that indicates all nodes in the communication network and lists the communication links that are associated with each node.

The various nodes in the communication network exchange link state information using link state advertisement (LSA) protocol messages. Link state information is exchanged at various times. In particular, when a node is initialized, the node needs to obtain link state information in order to determine routes for routing protocol messages, and therefore the node's neighbors send LSA protocol messages to the node in order to provide the node with the necessary link state information. Also, each node periodically tests the communication links to each of its neighbors and sends a LSA protocol message including the link status information to all of the other nodes. When a failure occurs in the communication network (such as a communication link failure or a node failure), the various nodes in the communication network need to obtain updated link state information in order to determine new routes for routing protocol messages around the failure, and therefore the nodes adjacent to the failure send LSA protocol messages to the other nodes in the communication network in order to inform all nodes of the failure. Each node computes the routes based upon the link status information received from the other nodes.

Any time link state information is exchanged, it is desirable for the link state information to be distributed quickly in order for the receiving node(s) to determine new routes for routing protocol messages. Unfortunately, routing protocols utilize a "stop-and-wait" mechanism for distributing link state information. When a node sends an LSA protocol message to a neighbor, the node waits for an acknowledgment from the neighbor before sending another LSA protocol message. This is a very simple but inefficient way to distribute link state information.

An efficient technique for distributing link state information is needed.

B. Appellants' Invention

In accordance with one aspect of Appellants' invention, a link state routing protocol utilizes a sliding window mechanism to efficiently distribute link state information. The sliding window mechanism permits a node to send multiple protocol messages without waiting for individual acknowledgements. The node can therefore have multiple unacknowledged protocol messages outstanding at any given time. The number of unacknowledged protocol messages that are permitted to be outstanding is referred to as a 'window size.' A typical embodiment might use a window size of eight (8) or 128, although the widow size may be set to other values and may be set based upon network characteristics (such as round trip delay to a neighbor) or other considerations. The neighbor may acknowledge protocol message one at a time, or may acknowledge multiple protocol messages together. Unacknowledged protocol messages may be retransmitted after a predetermined timeout period.

VI. Issues

A. Whether claims 1-31 were properly rejected under 35 U.S.C. §103(a) over Applicant's admitted prior art in view of "Internetworking with TCP/IP" by Douglas E. Comer. .

B. Whether claims 3, 11, 19 and 26 were properly rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' admitted prior art in view of Comer and further in view of Sridhar et al (U.S. Patent No.: 6,266,701).

VII. Grouping of Claims

Claims 1-31 do not stand and fall together. Claims 1-31 each stand on their own.

VIII. Argument

A. The Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. §103(a) for the rejection of claims 1-31 over Applicant's admitted prior art in view of "Internetworking with TCP/IP" by Douglas E. Comer.

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations." Manual of Patent Examining Procedure §2143.

1.) Appellants can find no suggestion or motivation to combine the reference teachings as suggested by the Examiner.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab,* 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The Examiner's motivation for modifying Applicant's prior art is found in the Final office action states, at page 3:

"...Given the teaching of Comer, it would have been obvious to one skilled in the art at the time the invention was made to incorporate sending a second packet to the receiver prior to receiving an acknowledgement message from the receiver for the first into the method of an applicant's admitted prior art by allowing the node to transmit multiple LSA protocol messages before waiting for an acknowledgement message for delivery reliability and a more efficient use of network bandwidth..."

Appellants note that it is well established that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

Appellants note that Comer is particularly interested in providing reliable stream delivery in a Transmission Control Protocol / Internet Protocol (TCP/IP) environment. Comer states, at page 175:

> "... Before examining the TCP stream service, we need to explore an additional concept that underlies stream transmission. The concept, known as a *sliding window*, makes stream transmission efficient. To understand the motivation for sliding windows, recall the sequence of events that Figure 12.1 depicts. To achieve reliability, the sender transmits a packet and then waits for an acknowledgement before transmitting another. As Figure 12.1 shows, data only flows between the machines in one direction at any time, even if the network is capable of simultaneous communication in both directions. The network will be completely idle during times that machines delay responses (e.g., while machines compute routes or checksums). If we imagine a network with high transmission delays, the problem becomes clear: *A simple positive acknowledgement protocol wastes a substantial amount of network bandwidth because it must delay sending a new packet until it receives an acknowledgement for the previous packet...*"

Comer is thus motivated to provide a sliding window acknowledgement for packet data stream delivery to optimize network bandwidth. As it is generally known, in the area of communication systems, and provided by support of documentation in paper 14, a "stream" is a group of contiguous data. The link state advertisement messages of the present independent claims 1, 4, 7, 15, 23 and 30 are not part of such a "stream" of data, but are *advertisements* of *link state* information, used as part of the well known "link state advertisement protocol".

However, Appellants respectfully disagree; the goal of the present invention is not to simply obtain maximum bandwidth for a link. Rather, the goal is to increase the speed by which a network can converge on a new path in the

event of failure of a link in the path, thereby reducing the number of dropped packets. Thus, as stated at page 7 of the specification ".. node 102 generally does not have to stop sending LSA protocol messages in order to wait for acknowledgements."

Accordingly, Appellants submit that one with the goal of the present invention would not be motivated to use the teachings of Comer as suggested by the Examiner. Accordingly, for at least the reason that the Examiner has failed to provide sufficient motivation for modifying the references, it is submitted that the rejection is improper and should be withdrawn.

2). The Examiner is using Impermissible Hindsight when determining that the references can be combined to meet the limitations of the claimed invention.

Appellants note that neither Appellants admitted prior art of Comer describes or suggests using the sliding window acknowledgement scheme for the purposes of increasing the speed with which link state advertisements can be exchanged, and accordingly submit that the Examiner is using impermissible hindsight in reaching the conclusion of obviousness, based on the teaching of Appellants invention.

It is well established that the point in time that is critical for an obviousness determination is at the time the invention. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference

or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983).

Obviousness cannot be established by hindsight combination to produce the claimed invention. In re Gorman, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). It is the prior art itself, and not the applicant's achievement, that must establish the obviousness of the combination.

Appellant's have realized and applied a sliding window acknowledgement scheme to link state advertisements. No mention or suggestion of this inventive step is found in any of the prior art references for using this mechanism in any other way than for stream transmission. Accordingly, Appellants can only assume that the Examiner is using improper hindsight in reaching the conclusion of obviousness. For at least this reason, it is submitted that the rejection under 35 U.S.C. §103 is improper and should be withdrawn.

3). The combination of references fail to describe or suggest every limitation in the claims.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royce*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C.

§103 then any claim depending there from is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claims 1-31:

Each claim of the present application is directed at a method of handling link state advertisement transmission and acknowledgement. In addition, each claim is directed to a method not disclosed or suggested in the prior art, whereby a link state advertisement is transmitted before a previous link state advertisement is acknowledged. Because each claim recites these elements, they do not stand or fall together.

For example, independent claim 1 recites "...sending a second link state advertisement protocol message to the neighbor prior to receiving an acknowledgement message from the neighbor for the first link state advertisement protocol message..." Independent claim 7 recites "...a link state routing protocol having a sliding window mechanism with a window size greater than one (1) for sending up to a predetermined maximum number of link state advertisement protocol messages without receiving an acknowledgement for any of said link state advertisement protocol messages..." Independent claim 15 recites "...the computer program comprising a link state routing protocol having a sliding window mechanism with a window size greater than one (1) for sending up to a predetermined maximum number of link state advertisement protocol messages without receiving an acknowledgement for any of said link state advertisement protocol messages..." Independent claim 20 recites "...A communication system comprising a node in communication with a neighbor, wherein the node includes a link state routing protocol having a sliding window mechanism with a window size greater than one (1) for sending up to a predetermined maximum number of link state

advertisement protocol messages to the neighbor without receiving an acknowledgement for any of said link state advertisement protocol messages from the neighbor..." Independent claim 30 recites "...A link state routing protocol comprising a sliding window mechanism..."

It would appear that the Examiner, in the rejection, is not giving patentable weight to the meaning of the word 'link state advertisements', and distinguishing them from a 'data stream' recited in Comer as being transmitted in the TCP/IP connection of Comer. Appellant's disagree that the terms are interchangeable. Appellants submit that since all of the limitations of the independent claims are neither shown nor suggested by the combination of Appellants prior art in view of Comer, the rejection under 35 U.S.C. §103 with regards to the below independent and dependent claims should be withdrawn.

B. **The Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. §103(a) for the rejection of claims 3, 11 19 and 26 over Applicant's admitted prior art in view of Comer and further in view of Sridhar, U.S. Patent No. 6,266,701.**

Sridhar describes a communication system for improving communication over a data network between an application and remote systems, where each of the remote systems is configured to communicate using at least one of multiple transport communication protocols.

1). Combination of references neither discloses nor suggests claims 3, 11, 19 and 26.

As noted above, the combination of Comer and Appellants' admitted prior art fails to disclose or suggest the use of any sliding window protocol techniques in the processing of link state advertisement messages, as the present independent claims 1, 7, 15, and 23, from which claims 3, 11, 19 and 26 depend. Sridhar et al. disclose a system for improving throughput on a data network, and provide some description regarding sliding window protocols. However, like the other cited references, Sridhar et al. include no hint or suggestion of even the desirability of applying any type of sliding window protocol in the context of link state advertisement messages, as in the present independent claims. Accordingly, Applicant respectfully urges that the combination of Comer, Appellants' admitted prior art and Sridhar et al. fails to support a *prima facie* case of obviousness with regard to the present independent claims 1, 7, 15 and 23. As claims 3, 11, 19 and 26 depend from those independent claims, they are believed to be patentable over the combined references for at least the same reasons. Reconsideration of all pending claims is respectfully requested.

IX. Conclusion

Appellant submits therefore that the rejection of claims 1-50 under 35 U.S.C. § 103 is improper for failing to provide a combination that teaches all elements of the claims and for failing to provide sufficient motivation to combine the cited references. It is therefore respectfully requested that the Board reverse the Examiner's rejections under 35 U.S.C. §103.

Respectfully Submitted,

7/23/2004
Date

Lindsay McGuinness, Reg. No. 38,549
Attorney/Agent for Applicant(s)
Steubing McGuinness & Manaras LLP
30 Nagog Park Drive
Acton, MA 01720
(978) 264-6664

Appendix A: Claims

1. (Previously Amended) A method for distributing link state information by a node to a neighbor in a communication system, the method comprising:
sending a first link state advertisement protocol message to the neighbor; and
sending a second link state advertisement protocol message to the neighbor prior to receiving an acknowledgement message from the neighbor for the first link state advertisement protocol message.

2. (Original) The method of claim 1, further comprising:
monitoring for an acknowledgement message from the neighbor for the first link state advertisement protocol message;
failing to receive the acknowledgement message from the neighbor for the first link state advertisement protocol message within a predetermined timeout period; and
retransmitting the first link state advertisement protocol message.

3. (Original) The method of claim 2, further comprising:
retransmitting the second link state advertisement protocol message.

4. (Cancelled)

5. (Cancelled).

6. (Cancelled)

7. (Original) A device for distributing link state information in a communication network, the device comprising a link state routing protocol having a sliding window mechanism with a window size greater than one (1) for sending up to a predetermined maximum number of link state advertisement protocol messages without receiving an acknowledgement for any of said link state advertisement protocol messages.

8. (Previously Amended) The device of claim 7, wherein the link state protocol comprises:
link state distribution logic operably coupled to generate link state advertisement protocol messages; and
sliding window logic responsive to the link state distribution logic and operably coupled to maintain a sliding window for sending up to a predetermined maximum number of link state advertisement protocol messages to a neighbor without receiving an acknowledgement for any of said link state advertisement protocol messages.

9. (Original) The device of claim 8, wherein the sliding window logic is operably coupled to send a first link state advertisement protocol message to the neighbor and to send a second link state advertisement protocol message to the neighbor prior to receiving an acknowledgement message from the neighbor for the first link state advertisement protocol message.

10. (Original) The device of claim 9, wherein the sliding window logic is operably coupled to monitor for an acknowledgement message from the neighbor for the first link state advertisement protocol message and to retransmit the first link state advertisement protocol message upon failing to receive the acknowledgement message from the neighbor for the first link state advertisement protocol message within a predetermined timeout period.

11. (Original) The device of claim 10, wherein the sliding window logic is operably coupled to retransmit the second link state advertisement protocol message.

12. (Original) The device of claim 8, wherein the sliding window logic is operably coupled to send the predetermined maximum number of link state advertisement protocol messages to the neighbor and to wait for an acknowledgement message from the neighbor for at least one of the link state advertisement protocol messages before sending another link state advertisement protocol message.

13. (Original) The device of claim 12, wherein the sliding window logic is operably coupled to receive the acknowledgement message from the neighbor for a first link state advertisement protocol message and to send another link state advertisement protocol message.

14. (Original) The device of claim 12, wherein the sliding window logic is operably coupled to retransmit at least a first unacknowledged link state advertisement protocol message upon failing to receive the acknowledgement message from the neighbor within a predetermined timeout period.

15. (Previously Amended) A program product comprising a computer readable medium having embodied therein a computer program for distributing link state information in a communication network, the computer program comprising a link state routing protocol having a sliding window mechanism with a window size greater than one (1) for sending up to a predetermined maximum number of link state advertisement protocol messages without receiving an acknowledgement for any of said link state advertisement protocol messages.

16. (Previously Amended) The program product of claim 15, wherein the link state routing protocol comprises:
link state distribution logic programmed to generate link state advertisement protocol messages; and
sliding window logic responsive to the link state distribution logic and programmed to maintain a sliding window for sending up to a predetermined maximum number of link state advertisement protocol messages to a neighbor without receiving an acknowledgement for any of said link state advertisement protocol messages.

17. (Original) The program product of claim 16, wherein the sliding window logic is programmed to send a first link state advertisement protocol message to the neighbor and to send a second link state advertisement protocol message to the neighbor prior to receiving an acknowledgement message from the neighbor for the first link state advertisement protocol message.

18. (Original) The program product of claim 17, wherein the sliding window logic is programmed to monitor for an acknowledgement message from the neighbor for the first link state advertisement protocol message and to retransmit the first link state advertisement protocol message upon failing to receive the acknowledgement message from the neighbor for the first link state advertisement protocol message within a predetermined timeout period.

19. (Original) The program product of claim 18, wherein the sliding window logic is programmed to retransmit the second link state advertisement protocol message.

20. (Original) The program product of claim 16, wherein the sliding window logic is programmed to send the predetermined maximum number of link state advertisement protocol messages to the neighbor and to wait for an acknowledgement message from the neighbor for at least one of the link state advertisement protocol messages before sending another link state advertisement protocol message.

21. (Original) The program product of claim 20, wherein the sliding window logic is programmed to receive the acknowledgement message from the neighbor for a first link state advertisement protocol message and to send another link state advertisement protocol message.

22. (Original) The program product of claim 20, wherein the sliding window logic is programmed to retransmit at least a first unacknowledged link state advertisement protocol message upon failing to receive the acknowledgement message from the neighbor within a predetermined timeout period.

23. (Original) A communication system comprising a node in communication with a neighbor, wherein the node includes a link state routing protocol having a sliding window mechanism with a window size greater than one (1) for sending up to a predetermined maximum number of link state advertisement protocol messages to the neighbor without receiving an acknowledgement for any of said link state advertisement protocol messages from the neighbor.

24. (Original) The communication system of claim 23, wherein the node is operably coupled to send a first link state advertisement protocol message to the neighbor and to send a second link state advertisement protocol message to the neighbor prior to receiving an acknowledgement message from the neighbor for the first link state advertisement protocol messages.

25. (Original) The communication system of claim 24, wherein the node is operably coupled to monitor for an acknowledgment message from the neighbor for the first link state advertisement protocol message and to retransmit the first link state advertisement protocol message upon failing to receive the acknowledgement message from the neighbor for the first link state advertisement protocol message within a predetermined timeout period.

26. (Original) The communication system of claim 25, wherein the node is operably coupled to retransmit the second link state advertisement protocol message.

27. (Original) The communication system of claim 23, wherein the node is operably coupled to maintain a sliding window for sending up to a predetermined maximum number of link state advertisement protocol messages to the neighbor, to send the predetermined maximum number of link state advertisement protocol messages to the neighbor, and to wait for an acknowledgement message from the neighbor for at least one of the link state advertisement protocol messages before sending another link state advertisement protocol message.

28. (Original) The communication system of claim 27, wherein the node is operably coupled to receive the acknowledgement message from the neighbor for a first link state advertisement protocol message and to send another link state advertisement protocol message.

29. (Original) The communication system of claim 27, wherein the node is operably coupled to retransmit at least a first unacknowledged link state advertisement protocol message upon failing to receive the acknowledgement message from the neighbor within a predetermined timeout period.

30. (Original) A link state routing protocol comprising a sliding window mechanism.

31. (Original) The link state routing protocol of claim 30, comprising open shortest path first (OSPF) routing protocol logic in combination with the sliding window mechanism.